WHAT IS CLAIMED IS:

1. A method of determining the oil content of a fluid emulsion comprising heavy oil and water comprising the steps of:

   (a) providing a low field NMR relaxometer;

   (b) measuring and recording the T_2 relaxation spectrum of the emulsion at a temperature allowing recovery of the T_2 spectrum of the heavy oil;

   (c) determining a T_2 cutoff value;

   (d) measuring the total amplitude of the spectrum at T_2 times less than and equal to the T_2 cutoff value (A_{oil}); and

   (e) converting A_{oil} to a weight value by dividing A_{oil} by the amplitude index of an oil standard of known weight (AI_{oil}).

2. The method of claim 1 wherein the temperature is about 30°C and the T_2 cutoff value is about 10 milliseconds.

3. A method of determining the water content of a fluid emulsion comprising heavy oil and water comprising the steps of:

   (a) providing a low field NMR relaxometer;

   (b) measuring and recording the T_2 relaxation spectrum of the emulsion;

   (c) determining a T_2 cutoff value;

   (d) measuring the total amplitude of the spectrum at T_2 times greater than the T_2 cutoff value (A_w); and

   (e) converting A_w to a weight value by dividing A_w by the amplitude index of a water standard of known weight (AI_w).

4. The method of claim 3 further comprising the steps of determining the total weight of the sample and determining the oil content of the emulsion by subtracting the water content of the sample from the total weight of the sample.

5. An apparatus for determining the oil content of a flowing fluid emulsion comprising heavy oil and water comprising:

(a) a low field NMR relaxometer having a NMR magnet positioned in proximity to a channel through which the emulsion flows, said relaxometer for measuring the T_2 spectrum of a the sample;

(b) means connected to the relaxometer for measuring total T_2 amplitude below a T_2 cutoff value value, wherein a substantial portion of the spectrum attributable to the oil is at T_2 values less than or equal to the T_2 cutoff value; and

(c) means for converting the total T_2 amplitude value to a weight value.

6. The apparatus of claim 5 wherein the T_2 cutoff value value is about 10 milliseconds.

7. The apparatus of claim 5 wherein the relaxometer operates at less than about 2 MHz.

8. The apparatus of claim 7 wherein the relaxometer operates at about 1 MHz.

9. The apparatus of claim 5 further comprising a heater for heating the emulsion flow.

10. An apparatus for determining the oil content of a fluid emulsion comprising heavy oil and water comprising:

(a) means for obtaining a sample of the emulsion;

(b) a low field NMR relaxometer for measuring the T_2 spectrum of the sample;

(c) means connected to the NMR relaxometer for measuring total T_2 amplitude below a T_2 cutoff value, wherein a substantial portion of the spectrum attributable to the oil is at T_2 values less than or equal to the T_2 cutoff value;

(d) means for converting the total T_2 amplitude value to a weight value.

11. A method of determining the oil content and water content of a fluid emulsion comprising heavy oil and water comprising the steps of:

(a) providing a low field NMR relaxometer;

(b) measuring and recording the T_2 relaxation spectrum of the emulsion at a temperature allowing recovery of the T_2 spectrum of the heavy oil;

(c) determining a T_2 cutoff value;

(d) measuring the total amplitude of the spectrum at T_2 times less than and equal to the T_2 cutoff value (A_{oil});

(e) converting A_{oil} to a weight value by dividing A_{oil} by the amplitude index of an oil standard of known weight (AI_{oil});

(f) measuring the total amplitude of the spectrum at T_2 times greater than the T_2 cutoff value (A_w); and

(g) converting A_w to a weight value by dividing A_w by the amplitude index of a water standard of known weight (AI_w).